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1 SHEET

COMPLETE SPECIFICATION

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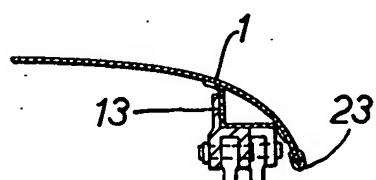
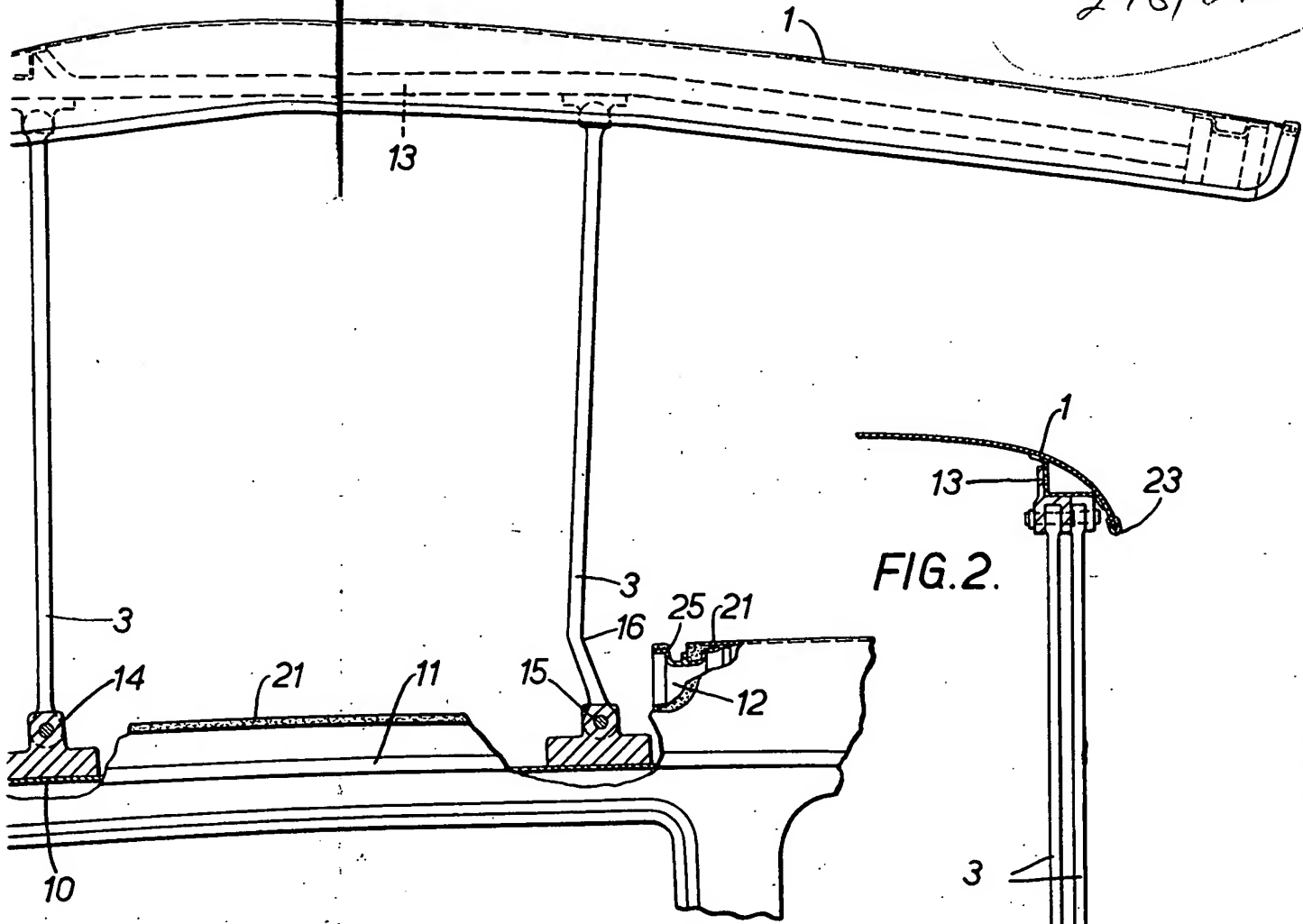


FIG. 2.

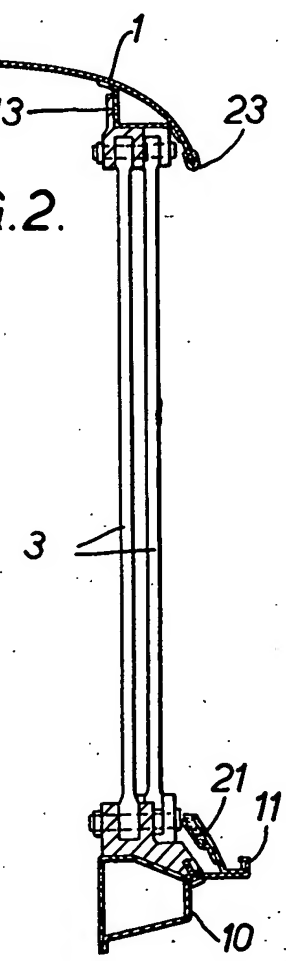
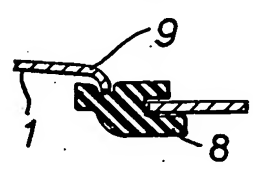


FIG. 5.



FIG. 6.



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FIG.1.

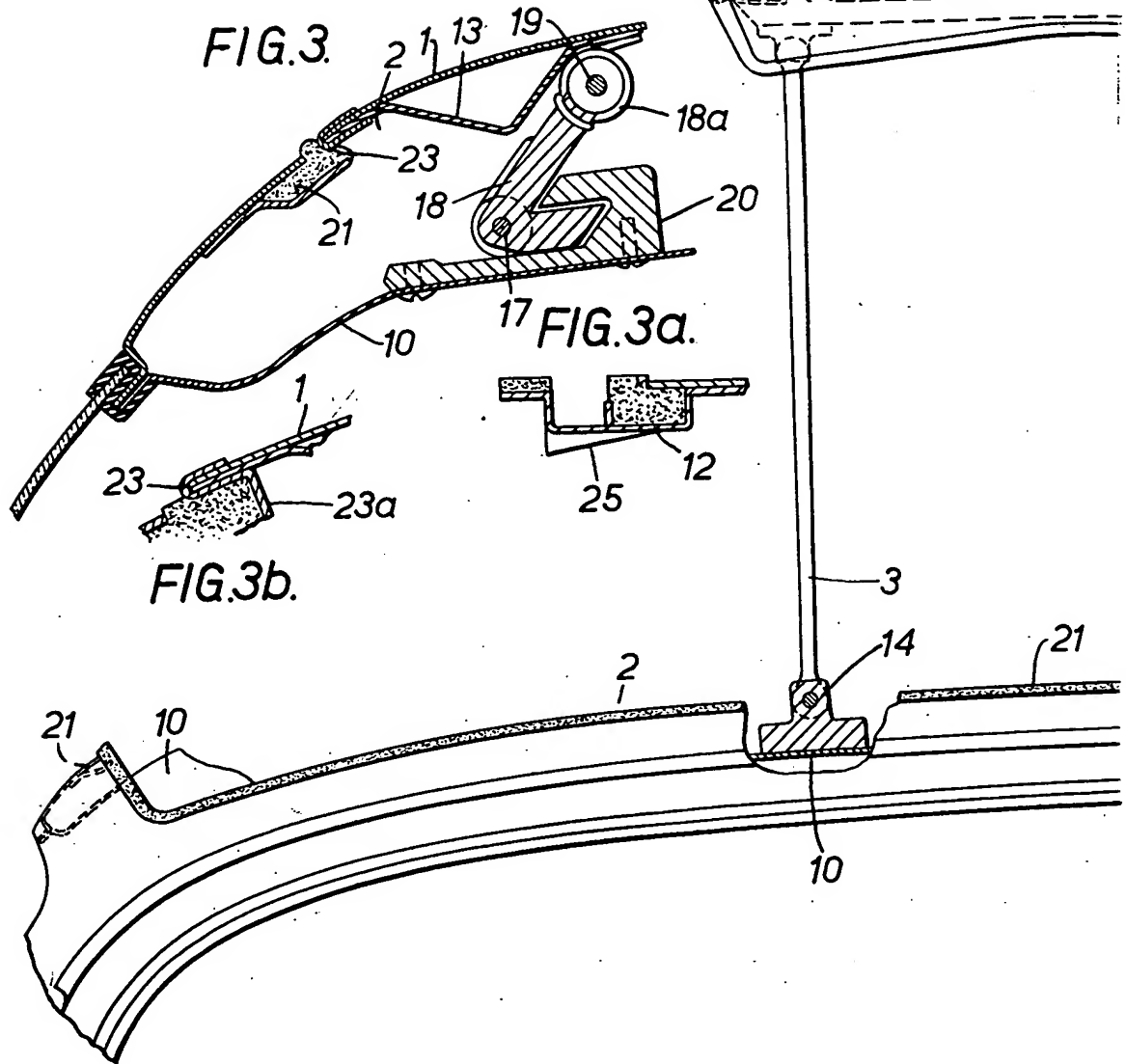


FIG.3.

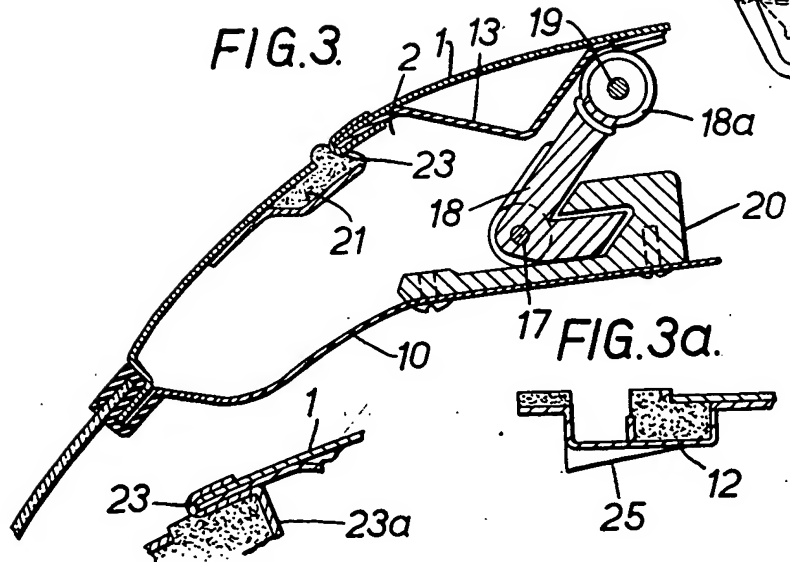


FIG.3a.

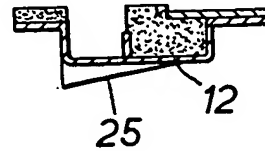


FIG.3b.

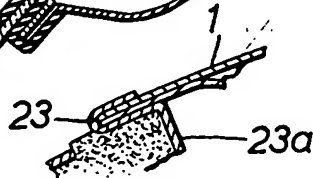


FIG.4.

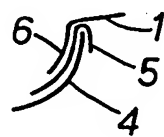


FIG.5.



PATENT SPECIFICATION

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871,469

DRAWINGS ATTACHED.



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Complete Specification Published : June 28, 1961.

GT. BRIT
DIV. *[Signature]*

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International Classification :—B62d.

COMPLETE SPECIFICATION.

Improvements in and relating to Movable Roof Panels for
Motor Vehicles.

I, JAMES DOWNING DOBSON, a British Subject, of 55 Grays Inn Road, London, W.C.1, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to movable covers adapted to expose from above an opening in the roof of a motor vehicle and particularly although not exclusively a motor car.

Slide-guided covers for this purpose are well known. There are two main types involving such covers. In some cases slide guides are connected directly to either wood or metal framing which forms part of the roof. The practice has been in one case to provide slide guides which also form external gutters on a wood frame and fabric covered form of roof and recessed or set in so that the top surface of the cover is flush with the remaining roof surface. With metal roofs comprising a metal skin on a wood or metal frame, the practice has been to have the slide guides on the frame between the outer metal skin and the inner fabric head lining and the sliding frame moves between the skin and the said lining.

The provision of recessed or set-in slide guides and the sliding action give rise to difficulties in obtaining positive sealing so that it has been the practice to fit suitable gutters with escape runways and sooner or later minor leaks and damage to the head lining are liable to occur. The parts are fittings involved in these constructions make the incorporation of the movable cover costly in manufacture or where the vehicle is being converted to have a sun roof.

[Price 3s. 6d.]

In recent years further problems arise. Modern pressed steel techniques for car bodies in general and roofs in particular involve a comparatively large area of sheet metal in the form of pressings of greater curvature than were previously used. This gives greater strength and rigidity so that many cars now dispense with cross-frame members and have a frame around the roof (which *inter alia* serves for the attachment of the fabric lining), enabling the height from roof to floor to be reduced, but if the sliding cover is then arranged to operate under the outer surface of the roof the inside height is unavoidably further reduced by the fitting of slide guides. These rather general convex curvatures also militate against the use of other than small covers and roof openings.

In consequence of the foregoing difficulties it has become the practice to avoid the fitting of sun roofs in the manufacture of modern popular motor cars.

The aim of the present invention is to provide a simple, smoothly operating movable roof cover which can be easily and positively sealed and to enable covers to be fitted without the need for fixing slide-guides to the roof structure and preferably without requiring special gutters.

It has been proposed to provide the roof with an opening and a cover therefor, the said cover being linked to the frame of the opening so that the cover can be swung clear of the opening or partially clear thereof so as to expose the opening or the major part thereof from above, but such proposals have involved complications in operation and securing in the closed or open position.

The present invention provides a vehicle having a roof provided with an opening and

a cover therefor, the said cover being linked to the frame of the opening so that it can be displaced to expose the opening, co-operating fastening means between the cover and the frame and a member or members operable by displacement to release the fastening means and by further movement to raise the cover.

The invention also comprises a vehicle having a roof provided with an opening and a cover therefor, the said cover being linked to the frame of the opening so that it can be displaced to expose the opening, the cover carrying the fastening means at one end thereof and co-operating fastening means being fixed at each end of the frame, the fastening means on the cover co-operating with the fastening means on one end of the frame to secure the cover in the closed position and co-operating with the fastening means at the other end of the frame to secure the cover in the open position.

Four or more links forming a parallel linkage may be used between the cover and the frame.

A particularly advantageous construction of the opening and cover which lends itself well to modern pressed sheet metal motor vehicle bodywork is one in which the opening and the cover extend across substantially the entire width of the roof, the roof has a frame which also forms three sides of the frame of the opening, the roof adjacent the rear side of the opening is provided with a curved bar which constitutes the fourth side of the frame around the opening and reinforces the said part of the roof, the cover is longitudinally and transversely arched in conformity with the roof arching and the cover sheds into the gutters of roof. The cover can then be made to conform to the general curvature of the roof and lie substantially flush therewith when closed and the cover may be readily adapted to existing bodywork with the aid of a said curved bar across the roof adjacent the rear of the opening to complete the frame therearound. The frame around the opening may be provided with channelling to locate sealing bead or strip (e.g., rubber with or without inserts of sponge rubber) opposed to the peripheral edges or margins of the cover itself where these edges or margins conform with the margin of the normal roof structure.

The fastening means may be constructed to hold the cover firmly down in sealed relation to the frame of the opening.

The arrangement may be such that the cover when moved to expose the opening rises and moves back to rest on a rear fixed part of the roof and it may be provided with suitable means, such as a resilient pad or pads to engage the said fixed part of the roof to prevent damage thereto. Alternatively

the cover may be arranged to be moved forwardly of the vehicle.

The fastening means may comprise spring loaded catches which co-operate either with co-operating means on the front of the frame when the cover is closed or with co-operating means at the back of the frame when the cover is open and these catches may be of suitable construction so as to clamp the sealing medium between the cover and the frame of the opening when the cover is in the closed position. The catches may be spring-loaded lever catches which can be operated by a continuous movement to release the fastenings and displace the cover.

Two catches may be constructed and arranged for simultaneous operation by a member serving as a master control and designed so as automatically to re-fasten. A pair of front catches operated by a master connecting rod will serve well and is hereinafter more particularly described.

The cover may be constructed and arranged so as to move above the plane of the top of the roof and not necessarily down onto the roof, in which case it may be designed to pass under a suitably designed luggage rack. Extensible links may in such or other cases be provided.

The linked cover may be readily incorporated into existing vehicles and a panel removed from the roof to provide the opening may be adapted to serve as the cover.

The fastening means may be operated and the cover displaced directly by hand or through suitable mechanical means from a remote position, e.g., from the driver's seat.

Where the cover is spring operated to force it down into the closed or open position, and bearing in mind that it may be operated whilst the vehicle is in motion, it may be desirable to provide for a braking effect on the movement of the cover and this may be effected by means of a friction cable-drum arrangement.

The manner of carrying out the invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a part longitudinal sectional view showing the cover and the opening and showing the cover as partially displaced;

Fig. 2 is a transverse sectional part view thereof; and

Fig. 3 is a fragmentary view of one of the fastenings;

Fig. 3a is a fragmentary detail view; and Fig. 3b a fragmentary view of a modified detail.

Figs. 4 to 6 show some modifications in detail.

In Figs. 1 to 3, the roof cover is marked 1 and the opening in the car roof is marked 2. The cover is pivoted to four links 3 the other ends of which are pivoted to the frame of

the opening. Mounting brackets 14, 15 may be fitted to the roof for this purpose.

Locking means, e.g., as hereinafter described, are associated with the forward end of the cover and the forward end of the opening and with the rear end of the opening so that when the cover is in closed position the forward locking means hold down and lock the cover in sealed position. When the cover is in the open position, the forward end of the cover may be held down by the locking device at the rear of the opening.

In certain modern pressed metal roofs, the pressings are marginally strengthened or fitted to form a reinforcing frame round the sides and front of the roof, and the links of the improved cover may be attached to this frame so that the cover extends across the full width of the roof. Catch members may be attached along the front of the frame and a reinforcing bar attached to the roof along the rear of the opening. The cover may be formed by a panel cut out of the roof with its front and side margins already curved and perimetally strengthened as compared with a panel cut out from a relatively flat area of the roof, or the cover may be formed as a separate manufactured unit especially if the cover and openings are formed in the manufacture of the vehicle.

In the form of construction illustrated diagrammatically in Figs. 1 to 3a, as is common in modern pressed metal motor car bodywork, the pressed metal work forming the sides, front and roof of the vehicle is reinforced by a frame 10 round the front and sides of the roof and a roof gutter 11 is provided. In the present case the said frame forms the sides and front of the frame of the opening 2, i.e., the opening extends across substantially the full width of the roof. The frame of the opening is completed and the roof adjacent the rear side of the opening reinforced, by welding or otherwise attaching a curved reinforcing bar 12 across the said part of the roof. The links 3 are pivoted to a reinforcing frame 13 secured to the cover 1 and to the sides of the frame of the opening by the brackets 14 and 15.

The links on each side of the cover may be offset from one another (as shown in Fig. 2) in the transverse direction of the cover so that they may be of any desired length without colliding with one another and one link of each pair may be cranked at 16 to clear the rear of the frame of the opening.

The fastening means comprise a transversely extending bar 17 having latch levers 18 at each end loaded by torsion springs 18a which levers are pivotally mounted at 19 to frame 13 fixed to the cover and each co-operate with a co-operating fastening or locking member 20 fixed on the frame 10 at each side of the front of the frame of the

opening. By operating this bar the latch levers are released and the cover raised by further movement. The levers are arranged to snap into engagement with the locking members when the cover is fully closed. The locking means may be designed so that the cover shall press firmly against the sealing means (hereinafter described) when the cover is closed. The aforesaid rear bar 12 of the frame of the opening has fastening or locking members 25 (Figs. 1 and 3a) with which the latch levers 18 co-operate when the cover is fully opened. By applying forward pressure on the bar 17 the catches may be released and the cover raised.

The links may incorporate turnbuckles for adjustment of length.

A channel 21 containing sealing material extends round the frame of the opening and the edges of the cover which engage the sealing means may be capped or beaded or otherwise reinforced as indicated at 13 and a channel like capping may be used with one end of the capping bent down to form a peripheral wall 23a (see the fragmentary view Fig. 3b) which may serve as a reinforcing frame for the cover and if need be replace other reinforcing framing as previously described and additionally serve to provide an angle to receive the sealing bead and improve sealing.

Fig. 4 shows a modification in which the cover has been formed with a marginal flange 6 and the margin 4 of the opening bent up and provided with a sealing strip 5 on which the cover rests.

Fig. 5 shows a panel that has been cut from the roof and enlarged in area by spot welding a marginal lip 7 around its edge.

Fig. 6 shows the section of a rubber moulding seal channel 8 to engage the edge of the frame of the opening and the margin 9 of the cover curved to engage the moulding.

The flange 6 or lip 7 serves to shed water off the cover when the cover is secured in the closed position.

The links may be arranged to be held down by springs (not shown) and these springs may operate when the cover is closed, or when it is open.

The links may be telescopic spring loaded links or the cover loaded by spring telescopic devices.

Although I have more particularly described the invention in relation to sun roofs for motor cars the roof cover may be provided on vans; covered lorries and the like for the purpose of more easily loading or unloading the vehicle, or to enable long objects which normally could not be carried within the covered space to be satisfactorily carried with one end projecting through the opening exposed by movement of the cover.

In such a case the roof cover may be conveniently arranged at the front or back of the roof and in the latter case the cover may be arranged to move forwardly over the forward part of the roof and the body of the vehicle may be provided with a movable, e.g., hinged door or doors so that the back of the body and the rear part of the roof may be moved to provide a large opening at the back for the removal or loading of goods into the vehicle.

WHAT I CLAIM IS:—

1. A vehicle having a roof provided with an opening and a cover therefor, the said cover being linked to the frame of the opening so that it can be displaced to expose the opening, and co-operating fastening means between the cover and the frame and a member or members operable by displacement to release the fastening means and by further movement raise the cover.

2. A vehicle according to Claim 1 the cover carrying fastening means at one end thereof and co-operating fastening means being provided at each end of the frame, the fastening means on the cover co-operating with the fastening means on one end of the frame to secure the cover in the closed position and co-operating with the fastening means on the other end of the frame to secure the cover in the open position.

3. A vehicle having a roof provided with an opening and a cover therefor, the said cover being linked to the frame of the opening so that it can be displaced to expose the opening, the cover carrying fastening means at one end thereof and co-operating fastening means being provided at each end of the frame, the fastening means on the cover co-operating with the fastening means on one end of the frame to secure the cover in the closed position and co-operating with the fastening means at the other end of the frame to secure the cover in the open position.

4. A vehicle according to any preceding claim in which the opening and cover extend across substantially the entire width of the roof and wherein the roof has a frame between it and the bodywork which frame also forms three sides of the frame of the opening and wherein the roof adjacent the rear side of the opening is provided with a bar which constitutes the fourth side of the frame round the opening and reinforces the said part of the roof.

5. A vehicle according to any preceding

claim in which there are at least four links which are pivoted to the sides of the frame of the opening and form a parallel linkage.

6. A vehicle according to any preceding claim in which sealing means extend round the full extent of the frame of the opening and are situated so that the cover will be substantially flush with the main part of the roof when the cover is closed.

7. A vehicle according to Claim 6 in which the sealing means are fixed liquid-tightly in a channel extending round the said frame.

8. A vehicle according to any of the preceding claims in which the cover is so connected by the links that it can be swung towards the rear of the vehicle on top of the main part of the roof when opened.

9. A vehicle according to any one of the preceding claims in which the opening and the cover are positioned at the forward part of the roof.

10. A vehicle according to any of the preceding Claims 1 to 8 in which the cover is so connected by the links and arranged that it can be swung forwards to expose the opening.

11. A vehicle according to any one of the preceding claims in which the movement of the cover with the links is under the control of spring means which operate to hold the cover down in either the closed or open position.

12. A vehicle according to any one of the preceding claims in which the fastening means on the cover comprise spring catches adapted to snap into engagement with the fastening means of the frame of the opening.

13. A vehicle according to Claim 12 in which pivoted catches are provided at each side of the frame of the opening connected by a cross bar which is operable against the spring action to release each catch from its co-operating fastening means simultaneously.

14. A motor vehicle with a roof opening and cover and associated means substantially as herein described with reference to and as illustrated in any of the forms illustrated in the accompanying drawings.

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Patent Agents for the Applicant,
Chartered Patent Agents.

PROVISIONAL SPECIFICATION.

Improvements in and relating to Movable Roof Panels for Motor Vehicles.

I, JAMES DOWNING DOBSON, a British Subject, of 55 Grays Inn Road, London, W.C.1, do hereby declare this invention to

be described in the following statement:—
The present invention relates to movable roof panels of motor vehicles and particu-

four links of the frame parallel linkage. The preceding tend round the opening ver will be part of the

Claim 6 in xed liquid-round the

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larly although not exclusively motor cars.

Movable roof panels are well known which involve slide-guide provision. There are two main types involving such provision. In some cases slide guides are connected directly to either wood or metal framing which forms part of the roof. The practice has been in one case to provide slide guides which also form external gutters on a wood frame and fabric covered form of roof and recessed or set in so that the top surface of the sunroof is flush with the remaining roof surface. With metal roofs comprising a metal skin on a wood or metal frame, the practice has been to have the slide guides on the frame between the outer metal skin and the inner fabric head lining and the sliding frame moves between the skin and the said lining.

The provision of recessed or set-in slide guides and the sliding action give rise to difficulties in obtaining positive sealing so that it has been the practice to fit suitable gutters with escape runways and sooner or later minor leaks and damage to the head lining are liable to occur. The parts and fittings involved in these constructions make the incorporation of the movable panel costly in manufacture or where the vehicle is being converted to have a sun roof.

In recent years further problems arise. Modern pressed steel techniques for car bodies in general and roofs in particular involve a comparatively large area of sheet metal in the form of pressings of greater curvature than were previously used. This gives greater strength and rigidity so that many cars now dispense with cross-frame members enabling the height from roof to floor to be reduced but if the sliding roof is then arranged to operate under the outer surface of the roof the inside height is unavoidably further reduced by the fitting of slide guides. These rather general convex curvatures also militate against the use of other than small panels and roof openings.

In consequence of the foregoing difficulties it has become the practice to avoid the fitting of sun roofs in the manufacture of modern popular cars.

The aim of the present invention is to provide a simple, smoothly operating movable roof panel which can be very simply fitted to the roof by pivot connection and can be easily and positively sealed and to enable panels to be fitted without the need for fixing slide-guides to the roof structure and preferably without requiring special gutters.

Broadly my invention consists in the provision of a roof panel which is directly connected to the vehicle structure by means of a parallel linkage device.

According to one form of the invention

the roof panel is pivoted to the ends of four parallel links the other ends of which are pivoted to the structure adjacent the edge of the aperture to be covered. The panel may be provided or associated with appropriate locking means which are releasable to allow of the panel being raised by the movement of the links. The arrangement may be such that the panel when moved to expose the opening rises and moves back to rest on a rear fixed part of the roof and it may be provided with suitable means, such as resilient feet, to engage the said fixed part of the roof to prevent damage thereto.

Appropriate sealing means is provided between the panel and the edge of the aperture and the locking means may be constructed and arranged to operate so as to draw the panel tightly down against the edge of the opening to obtain a good seal. The opening may be sealed by providing its edge and/or the edge of the panel with a rubber moulding or beading or stripping.

The metal around the perimeter of the opening may be pressed upwards, e.g., to a suitable curvilinear contour and a sealing strip may be secured over the edge formed by the pressed out material and the panel may have a perimetral flange to lie around the outside of said margin, the base of the panel preferably co-operating with the sealing strip. Rain may flow off the panel onto the roof and no gutter or like provision is wanted. The flange may be shaped to form a water shed.

The front of the panel may have means for co-operating selectively with the front of the opening or the rear of the opening so as to hold the front of the panel firmly in position in either the open or the closed position whilst the rear of the panel may be provided with means to co-operate with the rear of the opening when the panel is in the closed position so as to hold the rear of the panel then firmly to the structure at the rear of the opening. Spring-loaded lever-operated catches may be used for securing both the front and the rear of the panel in position and these may be of suitable construction so as to clamp the sealing medium between the panel and the edge of the aperture when the panel is in the closing position.

An alternative form of seal may be formed by providing a frame or frame-forming strips as a moulding or mouldings shaped with a grooved head to fit tightly over the margin of the opening and with a countersunk or recess-forming flange which may be grooved and on which the edge of the panel seats. In such a form the panel boundary may be within the aperture, but in cases where the panel is desired to overlap the margin of the opening, and this is particularly advantageous because any collecting groove which

might act like a gutter can be entirely dispensed with, the panel may be made larger in area than the opening and for example if it is desired to employ as the panel the material removed to form the opening, the panel may be enlarged by appropriately securing as by welding a flanged or other marginal extension around the panel.

I may provide the links with a spring loading so that the panel will be forced down into sealing relation with the edge of the opening by the spring pressure, e.g., spring loaded telescopic links may be employed. Alternatively short spring loaded links may be employed which operate to hold the cover above the opening, and when the cover is ready to be closed this is drawn close by lever operated, and if desired spring-loaded catches to secure the panel in sealed position.

The catches may be individually operated or constructed for group operation from a master control and they may be designed so as automatically to re-fasten.

The panel may be constructed and arranged so as to move above the plane of the top of the roof and not necessarily down onto the roof, in which case it may be designed to pass under a suitably designed luggage rack. Extensible links may in such a case be provided.

The panel may be of a rigid or framed flexible material and may be of metal or other material in the first case and if desired of transparent or translucent material.

The linked panel according to the invention may be readily incorporated into existing vehicles and the panel removed to provide the aperture may be used and if necessary marginally adapted to serve as the aperture-cover panel.

The panel may extend across the width of the roof in which case the links may be pivoted to side bars of the panel of the vehicle body, which bars, being of strong construction, e.g., over the windows, serve well to support the panel. The side edges of the panel may be formed to shed water laterally and sealing along the side edges may on occasion be dispensed with.

The panel may be displaceable directly by hand or through suitable mechanical means from a remote position, e.g., from the driver's seat and the locking devices may be operated from the same control. In one form of construction according to the invention the panel is pivoted to four links the other ends of which are pivoted to the roof adjacent the edge of the aperture. Mounting brackets may be fitted to the roof for this purpose.

Locking means e.g., as previously described are associated with the forward end of the panel and the forward end of the aperture and with the rear end of the panel

and the rear end of the aperture so that when the panel is in closed position the locking means at both ends hold down and lock the panel in sealed position and when the panel is in the open position, the forward end of the panel will be held down by the locking device at the rear of the aperture. The margin of the aperture may be bent up to form a curved flange having a sealing strip secured thereto (or on the underface of the panel), the panel having a marginal flange to shed water off the panel onto the main part of the roof when the panel is in closed and sealed position.

In certain modern pressed metal roofs, the pressing is marginally channeled and thereby reinforced round the sides and front of the roof, and the links of the improved panel may be attached to this channeling so that the panel extends across the full width of the roof. The fastenings may be attached along the front channeling and others along a bar attached to the roof along the rear of the aperture. In some cases the links may be pivoted so that they can be accommodated in such a channeling. A panel cut out from such a roof may have its front and side margins already curved and strengthened as compared with a panel cut out from a relatively flat area of the roof. A form of sealing may conveniently be adopted with the rubber moulding sealed by the channeling.

If the panel is formed by the metal cut out from the roof, it may be enlarged in area by welding a marginal lip round its edge.

Alternatively a rubber or other suitable resilient bead may be secured around the margin of the aperture and the panel marginally curved (or bent down) so as to press edgewise on the bead.

Although I have more particularly described the invention in relation to roof panels for motor cars the roof panel may be provided on vans, covered lorries and the like for the purpose of more easily loading or unloading the vehicle, or to enable long objects which normally could not be carried within the covered space to be satisfactorily carried with one end projecting through an opening exposed by the movement of the panel. In such a case the roof panel may be conveniently arranged at the front or back of the roof and in the latter case the panel may be arranged to move forwardly into or over the forward part of the roof and the body of the vehicle may be provided with a movable, e.g., hinged door or doors so that the back of the body and the rear part of the roof may be moved to provide a large opening at the back for the removal or loading of goods into the vehicle.

Provision may be made for locking the

panel in any desired partly open position, e.g., two or more thumb screws may be provided for holding the aforesaid links firmly in fixed position by engagement with the links adjacent their pivotal connection to the roof framework.

The panel may if desired be spring loaded so that the spring pressure operates to close or assist the closing of the panel.

10 In less simple forms of the invention, the

provision may be made for hydraulically or electrically displacing the panel and/or it may be constructed for operation by a remote control.

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